Trasformismo or Transformation? The global political economy of energy transitions

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Abstract

What does IPE have to contribute to pressing policy and academic debates about the urgently required transition to a low carbon global economy? Despite the obviously global, political and economic dimensions of such a transition – often likened to the 'great transformation' or the Industrial Revolution in its magnitude – insights from IPE have yet to be brought to bear on the question of what form such a transition might take: the relations of power which will frustrate or enable it; the historical precedents for previous transformations in dominant structures of production, finance and technology in the global economy; and the potentially central role of the state and institutions of global governance. This article seeks to contribute to the analysis of transitions grounded in different strands of literature from neo-Gramscian and historical materialist IPE and political economy more broadly. It focusses, in turn, on the role of the state in transitions; the ways in which the globalisation of the global economy structures the possibility and likely form of transitions; and the role of global governance institutions in key energy and economic domains. For scholars of IPE, it demonstrates the centrality of energy in linking power, production and world order and highlights the need to further engage with questions of transformation in energy systems that are central to the organisation of the global political economy. This throws up questions around production, finance, technology, governance and justice which IPE scholars should be well placed to speak to, while requiring that energy takes up its rightful place as a lens for understanding and revising orthodox comprehensions of political, economic and social processes.

Keywords: energy-transitions-capitalism-climate change-hegemony-power-production

"The 'Great transformation'- the ecological conversion of industrial societies into a climate compatible, resource-conserving and sustainable world economic order, requires far-reaching and manifold tasks to shape it, which, in their make-up, are neither purely scientific and technological nor purely social or political. The transformation process should lead to just and sustainable governance over the use and management of global, regional and local commons". (Heinrich Böll Foundation, 2013)

1. Introduction: Great Transformations

Human-induced climate change is at the epicentre of renewed attention to the need for (another) 'great transformation' amid talk of a new, or third, 'low carbon' industrial revolution, requiring disruptive change in the form of radical reductions in emissions and large-scale technological breakthroughs as part of the pressing need for transition to a low carbon global economy (WBGU 2011). As the quote above highlights, however, a great transformation also implies nothing less than the creation of a 'sustainable world economic order' entailing 'just and sustainable governance over the use and management of the global, regional and local commons', placing the challenge firmly on the terrain of International Relations and IPE.

Notwithstanding recent literatures in IR on global energy governance (Florini and Sovacool 2009; van de Graaf 2013), and on global climate governance (cf Bulkeley and Newell 2014; Hoffmann 2011), the global politics and political economy of transition from one energy order to another, as is required to address climate change, have been neglected. Besides a very recent spike in interest (Di Muzio and Ovadia 2016; Van de Graaf et al 2016), Susan Strange's invitation in her seminal book on *States and Markets* (1988) to take energy seriously in IPE has not been taken up for the most part where a mutual neglect by IPE scholars of questions of energy (beyond oil) and energy transitions in particular, as well as by energy policy scholars of IPE persists, thereby frustrating a productive cross-pollination of insights. Given the centrality of energy to state power, geo-politics, international economic relations and the global politics of sustainability, this is particularly surprising and problematic.

Beyond IR, the overwhelming technological and economic focus of many policy and academic debates focussed on (socio-technical) transitions has been to the detriment of a fuller engagement with the deeper politics of transition where attention to *global* political dimensions is particularly notable in its absence. Within academia, a literature on transitions and transitions management has developed to identify and explain the necessary components of a socio-technical transition (Elzen et al, 2004; Geels, 2005; Loorbach, 2007). This explores the interaction of elements of a socio-technical system across several levels, from a niche technology and its supporters seeking to break into a market controlled by incumbent interests - thought to be part of a 'regime' (often assumed to be operating at the national level) - up to a series of landscape pressures. These include climate change and shifts in international energy markets which exert disruptive pressure upon the regime as the prevailing way of organising an energy system and its services, the effect of which is to enable a transition away from this dominant mode of organisation. The need to understand the ways in which pressures from above and below can 'lead to cracks, tensions and windows of opportunity' (Geels 2010: 495) opens up space for insights from IPE about who the agents are in this process and how the forms of power that they exercise are able to bring about transitions in energy systems.

But while useful in exploring the role of emergent or so-called 'niche' technologies (such as wind and solar) and policy regimes, literature on socio-technical transitions continues to neglect questions of politics and power beyond specific management strategies and governance practices (Shove & Walker, 2007; Scrase & Smith, 2009; Scoones et al 2015). Recent contributions have sought to address this neglect (Meadowcroft 2011; Geels 2014; Kern 2011; Kuzemko et al 2016), but placing power, political economy and world orders at the forefront of analysis, as is proposed here, both challenges and goes beyond this useful but narrower focus upon socio-technical transitions and their governance. It does so by foregrounding the relations of global power which shape particular institutional configurations and socio-technical possibilities.

It is argued here that attending to the role of states in energy transitions; the enabling and constraining effect of contemporary globalisation; and the role of global governance institutions can form the basis of constructive engagement with these debates drawing on insights from literatures in critical IPE in particular. It provides a source of clues as to the prospects of steering the great forces of human history in more sustainable directions – in particular, towards the de-carbonisation of the global economy – by drawing attention to the relationships among states, the global economy, and global governance. This serves to highlight vulnerabilities, weak spots, and active agents of change that will need to be enrolled in any project of transformation beyond more narrowly conceived socio-technical transitions.

An approach grounded in historical materialism lends a more historical perspective to debates about precedents for and the possibilities of transitions and transformations in society and the economy—not just in alignments of technology and social practice. This is consistent with an historical materialist approach to studying an emergent world order 'in terms of its economic, political and socio-cultural dimensions, with a view to its emerging contradictions and limits and the possibilities these imply for different collectivities' (Gill 1993: 16). Gramsci distinguishes this approach to showing how ideas and material conditions are always bound together, from a more reductionist 'historical economism' which reduces all explanations to the material sphere (Gramsci 1971). This approach can build on previous histories of transitions which emphasise factors such as the role of prices, science and human capital (Fouquet & Pearson, 2012; Grubler, 2012; Pearson & Foxon, 2012; Allen, 2012). But rather than view the technological and the social context which supported particular transitions in isolation, the emphasis here is on identifying the underlying political, historical and material factors that enable large-scale transformations to take place which will inform our understanding of the contemporary global politics of energy transitions. This is critical to appreciating the terrain upon which competing social forces will contest the future organisation of the economy in a carbon constrained world, based on their role in shaping and resisting previous political change and how they have engaged with the challenge of an energy transition to date (Podobnik, 2006), given that the scale of the challenge is often likened to that of creating a new global Industrial Revolution.

This more explicitly political and historical analysis allows us to move beyond glib statements about 'green growth' and 'win-win solutions' to the climate crisis to reveal the conflicts, trade-offs and compromises implicit in a fundamental re-structuring of an economy and the relations of power that will determine which pathways are pursued. The 'incumbent' regime of existing actors and interests, that benefit from on-going reliance on a fossil fuel economy and that have played such a decisive role in the development of capitalism over the last century and beyond (Yergin 2008), will not give up their position easily. Nor will states that depend indirectly on the revenues generated by these actors be likely to initiate or welcome structural change. Since energy use, in particular, is closely correlated with growth, proposals to transform its provision and distribution confront both high levels of state intransigence to reform proposals, as well as financial and political support for fossil fuel interests that continue to provide the lion's share of the world's energy (Newell and Paterson 1998).

In order to construct this analysis, the paper draws on work within different strands of IPE and political economy literature to develop an understanding of the politics of transformation and the relations of power which enable and frustrate progress towards a lower carbon economy. Herein lies the tension between the increasingly recognised need for transformation and the ability of incumbent actors to narrow the debate to questions of incremental transition through 'trasformismo'. This refers to the ability to accommodate pressures for more radical and disruptive change and to employ combinations of material, institutional and discursive power to ensure that shifts which do occur in socio-technical configurations do not disrupt prevailing social relations and distributions of political power. The Gramscian concept of 'trasformismo' describes a process of co-optation that 'serves as a strategy for assimilating and domesticating potentially dangerous ideas by adjusting them to the policies of the dominant coalition and can thereby obstruct the formation of organised opposition to established social and political power' (Cox 1983: 166-7). In the current world order a combination of ideational, institutional and material sources of power serve to maintain the status quo and accommodate pressures for more far-reaching change, in ways usefully highlighted in work which draws on Antonio Gramsci's insights on hegemony (Cox 1987; Levy and Newell 2002).

The question, explored later in the paper, is whether the historic bloc which results from this power and sustains the fossil fuel economy is slowly crumbling and whether a new one might emerge from the interregnum organised around a new configuration of social forces, state power and different fractions of capital. Though identifying and examining all elements of the assemblages which sustain fossil fuel incumbency is beyond the scope of this paper, I suggest below that the incumbent regime around fossil fuels can usefully be understood as an expression of hegemony: an alignment of 'structures and superstructures' (Gramsci 1971: 366). As we do below, the analysis of the relationship between a particular material base and superstructure of institutions and ideologies has to be placed in the context of a particular historical moment in order to assess its vulnerability to change (Morton 2007).

To ground such an analysis, the article first looks at the role of the state as a site of contestation between labour and different fractions of capital and civil society. An emphasis on the social relations which characterise the state provides a more critical and variegated account of the state's role in 'transition management' (Loorbach 2007) than would be afforded by state/market binaries, shedding light on how the terms of transition are set and by whom: the contested terrain of accommodation and opposition around shifts to the energy regime. Second, it explores how re-orderings of the international economic system in the form of the globalisation of production and its associated shifts in power (i.e. disciplinary neo-liberalism and a finance-led regime of accumulation) have both imposed constraints, but also opened up vulnerabilities and opportunities to lever change. Third, it looks at the prevailing global energy order and in particular at the governance and un-governance of energy transitions, as it is practiced by institutions with explicit environmental and energy mandates, as well indirectly by global trade and investment regimes. This includes an emphasis on the role of multilateral development banks and donors in constraining the policy autonomy of (some) states to manage transitions on their own terms.

This analysis and the framework for interpreting it reveals, on one level, the contested terrain of *transition* where there is competition between incumbent regimes locked into the reproduction of energy systems largely reliant on the use of fossil fuels and niche technology providers and financiers seeking to carve out a lower-emissions market share. On another level, however, it highlights a deeper tension at play around the disputed need for *transformation.* The difference lies between modest re-arrangements in modes of regulating and governing technology and social systems which shift technology and regulation in lower carbon directions, but without disrupting dominant distributions of economic and political power, as opposed to calls for a 'just transition' or deeper transformations where questions of who owns and has access to production, finance and technology are also at stake and the overall development pathway is up for negotiation (Stirling 2014). In this context *trasformismo* is the political attempt to manage this terrain: to ensure that politics and policy reinforce a market liberal approach to transitions *within* capitalism as opposed to more sweeping transformations of it. This is visible in the attempts to align responses to climate change with the imperatives of capitalist accumulation, accommodating and obscuring its indictment of a fossil-fuelled global political economy.

2. Towards a GPE of Energy Transitions

In order to develop the basis of a contribution from IR to these critical global debates I draw on resources within political economy and IPE to deepen an understanding of the global political economy of transitions. While an argument can be made that British and American schools of IPE have something to contribute to understandings of energy transitions (Kern and Markard 2016; Kuzemko et al 2018, this SI), this paper highlights a series of missing dimensions that can be addressed by engaging more critical traditions. The neo-Gramscian approach adopted here is distinct from accounts which could draw on liberal IPE to explore the global governance of energy, or the relationship between energy and trade, for example, as a product of inter-state regime formation rather than the broader social relations of power explored here. Or, drawing on Realist IPE, to link the geopolitics of energy to the shifting balance of power in the world without reference to the material base of institutional and ideational superstructures upon which it rests. The account developed here helps to address basic concerns with *who* and *how* and *for whom* production is organised and re-organised in a given historical period: the

relations of power which underpin this and what this might imply for current efforts to transition to a different production base with its attendant political implications. Understanding the prospects of change in the contemporary context requires attention to the nature and distribution of power among those actors that control the forms of production, finance and technology that at once (re) produce the current climate-energy crisis and, at the same time, need to be transformed along lower carbon lines. Given that the very actors dominating and benefiting most from the status quo are the ones that assume the authority and power to address it, it is hardly surprising that such global elites prefer *trasformismo* – limited forms of transition aimed at creating new sites of accumulation for finance and technology providers – to transformations in the base of production and the relations of power.

What an account grounded in (international) political economy, as it is presented here, draws attention to is the role of social forces in organising and re-organising capitalism. This helps us then to identify some of the drivers of our current predicament and the terrain upon which short-term change will have to be built. In so doing it re-engages with the politics and political economy of 'great transformations' (Polanyi 1980) which get overlooked in contemporary reformulations of transformations as exercises in assembling a new round of growth, investment and technology without attending to the social and power relations which underpin them (Stirling 2014). Neo-Gramscian scholarship, in particular (Cox, 1987; Gill, 1993; Rupert, 1995), which holds the relationship between production, power and world order at the heart of its analysis, can form the basis of such an account through an emphasis on the role of historic blocs in sustaining particular energy orders as well as being alert to transformational possibilities within and beyond them. I suggest that such an approach is particularly pertinent because climate change presents us with the need for change in the prevailing political order (of states and institutions, of the base of production, industries, technologies and ideas and the links between them) rather than a potentially more modest shift in technology and series of discrete social practices. This is because energy is the life-blood of the economy (Huber 2013) and the basis of industrial civilisation (Malm 2016) and its growth imperatives and is intimately entwined with security politics (see Wilson this SI): it links production, power and world order in ways that must assume a central place in our analysis.

Re-positioning debates about transitions from understanding socio-technical change to the study of how ideational, institutional and material forms of power are brought to bear to shape global energy pathways, creates a space for scholars of IPE to furnish an account of how change occurs in international society, an appreciation of the social relations of production and insights into how existing orders seek to accommodate threats to their legitimacy. Firstly, a focus on state power and competing social forces sheds light on the role of the state in mediating struggles and conflicts between labour and capital, in projecting global power, as well as shaping and being shaped by global institutions which extend or circumscribe their control over energy (politics). It highlights competition between different fractions of capital and their reliance upon particular types of energy for the success of their accumulation strategies and the central role of labour in struggles over control of the means of production and the proposed beneficiaries of a 'just transition' to a lower carbon economy (Swilling and Annecke 2012). This goes beyond the narrower question of how to govern energy transitions (Verbong and Loorbach 2012) while also transgressing the bounded notions of state and market that often frame enquiries in IPE.

Secondly, attention to the role of globalisation is critical to understanding the both the production of climate change and the scope for articulating lower carbon pathways in a globalised economy. For example, it draws attention to the power afforded to finance capital by enhanced mobility in conditions of heightened globalisation to delimit the range of policy options available to states. But it also highlights the role of finance in enabling technological revolutions and unsettling incumbent regimes, suggesting scope to re-organise the energy base around what Regulation theorists refer to as a new 'regime of accumulation' and 'mode of regulation' (Aglietta, 2000). The concept of regime of accumulation refers to the way in which production, circulation, consumption, and distribution organize and expand capital in a way that stabilizes the economy over time. The modes of regulation required to stabilize these regimes include the law, state policy, corporate governance and cultures of consumption which are increasingly transnational in nature, as elaborated below in the discussion on the

internationalization of the state. Indeed, as Jessop suggests, socially embedded and regularized institutions and social forces are 'organized around the *expanded* reproduction of capital as a social relation' (Jessop 2002:7; emphasis added). Understanding this shift in power is important to understanding changes in the global economic 'landscape' affect national energy transition strategies.

Thirdly, attention to the global governance of energy transitions is critical to understanding not only the specific role of global institutions in the energy, environment and trade domains, but also provides an entry point for comprehending the energy world order of which they are part and which they collectively represent. Whereas the historic bloc favouring fossil energy has been hegemonic to date as a material base and institutional superstructure, the analysis here, consistent with a neo-Gramscian analysis, explores the extent to which change in the incumbent order might be possible and where a shift from transition under conditions of *trasformismo* to broader forms of transformation could be envisaged.

3. States of Transition

In debates about transitions to a low carbon economy there is much emphasis on the role of state as the principal actor that will manage, enable or facilitate progress towards a transition using its convening power to bring together key actors, broker deals and construct transition plans as many industrialised and developing countries have now done (see also Kuzemko 2018, this SI). Yet as Lawton and Murphy note of the transitions literature, 'importantly, and sometimes problematically, the state is typically portrayed as a progressive, collaborative, "facilitator-stimulator-controller-director" of the transition management process' (Lawton and Murphy 2011: 359), without attention to the different dimensions of state power and what these imply for the possibility and likely form of transitions (Johnstone and Newell 2017). The role of the state in relation to transitions can range from supporting research, development and innovation in its entrepreneurial form (Mazzucato 2011), employing a plethora of policy tools and economic instruments to tax, support, protect and regulate industries, using the machinery of democratic government to promote and safeguard spaces of deliberation over competing energy futures, as well as more regressively using its monopoly on the use of force to acquire land, criminalise protest and overturn opposition to large energy projects (Dunlap and Fairhead 2014).

This is the first area where critical IPE can contribute to our understanding of the role of the state in global energy transitions. There is clearly uneven power, capability and inclination among states to assume the roles ascribed to them in transition plans, their own NDCs (Nationally Determined Contributions) submitted to the climate negotiations and global sustainability strategies such as the SDGs (Sustainable Development Goals). This is a function of capacity (political and economic) as well as willingness to engage in transition processes given close ties that often exist with incumbent economic interests that are threatened by interventions which jeopardise their ability to maximise profits from their existing control over production, technology and finance. In many contexts, incumbent actors have the power to set the terms and pace of transition by being conferred a role in determining access for new market entrants. Thus in South Africa, the monopoly electricity supplier Eskom was given a key role in deciding which independent power producers were allowed to enter the country's profitable energy market (Baker et al 2014).

In this regard, critical IPE literatures raise questions about who the state serves and whose interests the state is most responsive to. Given the intimate connection between predominantly fossil-based energy and growth, providers of that energy acquire structural power over state managers, enabling large energy companies to argue that serving their needs provides a sure means of stimulating the economy as a whole such that they should not be treated as a business interest like any other (Newell and Paterson 1998). The challenge from this perspective is how to create a sense in which the interests of capital in general are served by a shift to a low carbon economy by constructing 'coalitions of the winning and the willing' from such a transition (Newell and Paterson 2010). This implies a fluidity in the composition of social forces within the state. In Gramscian terms 'the state is conceived of as a continuous process of formation and superseding of unstable equilibria between the interests of the fundamental group and those of the subordinate groups- equilibria in which the interests of the dominant

group prevail but only up to a certain point' (1971: 182), suggesting scope for niches and competing interests to unsettle incumbent power.

Thinking about the state in terms of the balance of forces competing to shape energy policy is important to explain what might be possible (in terms of capacity), who sets the terms of a transition debate: external and internal constraints and veto coalitions; and whom it benefits. Concretely this will help to determine the likelihood that a low carbon energy pathway be aligned with broader social and developmental goals as suggested by notions of 'climate compatible development' (Maxwell and Mitchell 2010), or the idea of a 'just transition' (Swilling and Annecke 2012; Newell and Mulvaney 2013) where, beyond picking winning technologies and companies, the emphasis is on a broader social compact for transition that also compensates and rewards potential losers from a shift in strategy. While developmental states (Leftwich 2000) and 'green entrepreneurial states' can adopt pro-active industrial policy though the use of tax and Research and Development policies, for example, and steer markets to align them with nationally determined developmental goals as China, India and Brazil have done (Pegels 2013), many other states have less freedom of manoeuvre.

What critical IPE brings to this discussion then, drawing on work on 'developmental space' and 'policy autonomy' (Wade 2003; Gallagher 2005), is a realistic sense of how much scope developing countries in particular have to pursue transitions on their own terms, given the extent to which they are dependent upon aid. While South Africa can insist on including conditions for investors in its public procurement programmes for renewable energy around local content requirements and Black Economic Empowerment, more aid-dependent countries in the region (such as Mozambique or Kenya) find their energy choices more strongly shaped by donors (Baker et al 2014). The diverse and uneven integration of states into the global economy also draws attention to the disciplining effect of trade rules which in some cases 'kick away the ladder' (Chang 2002) that richer countries used to industrialise (through subsidies, looser IPR arrangements, support to infant industries) which we can observe for example in conflicts at the WTO between the US and China over support to solar and wind industries (ICTSD 2011). What these literatures may shed some light on is the extent to which and the ways in which countries' freedom of manoeuvre to select energy pathways may be restricted by the disciplinary power of donors or international institutions, as in the case of Kenya's 'market-led' energy transition (Newell and Phillips 2016). This usefully checks the assumption that transitions can be made up of open ended choices. Moreover, understanding this competitive terrain as a 'green division of labour' between states helpfully captures this 'collective and interdependent process by dozens of states, all striving in different ways to promote capital accumulation on their soil ... the globally connected patterns through which different states and firms pursue accumulation in the local and global contexts in which they are embedded' (Lachapelle et al 2017: 311-312).

Adequately capturing the diversity among states' positions within the global political economy and their degree of independence from or control over the actors and sectors whose activities need to be transformed, requires a more nuanced and desegregated understanding of the state than is found in most IR accounts. Work looking at different models of states and their policy-making processes (whether more or less managed, market, corporatist, social democratic/state-led, deliberative or entrepreneurial) and what difference that makes to generating visions, negotiating with key actors and enacting change is particularly useful here (Kuzemko et al 2016; Kern 2011). Such an enquiry might also be informed by political economy work on varieties of capitalism (Hall and Soskice 2001) given that the nature of bargaining with business and labour reflect different political economies and ideologies about the role of the state in the economy including in relation to key policy domains such as energy, industry and transport (Milkner and Harrison 2012). Lachapelle and Paterson (2013) show, for example, how coordinated market economies have established the most robust and generous regulatory and subsidy supports for renewables, including packages of traditional and market-based regulation of fossil energy, net metering policies, feed-in tariffs, renewable energy standards for utilities and subsidies for both manufacturers and installers of renewable technologies. This helps to account for the very different positions of the UK and Germany, for example, with regard to support for renewable energy, reflective of different electoral systems and attitudes towards the possibility and desirability of state intervention (Lockwood 2015).

More ambitious strategies for embracing renewable energy have been adopted in countries ranging from China and Kenya to Uruguay, Germany and Denmark, for a variety of different reasons, including seeking to secure first-mover advantages for state-owned and private firms (Germany, Denmark, India and China), reducing dependence on imported energy (India, Uruguay), and reducing vulnerability to the effects of climate change on energy generation capacity (such as hydropower) (Kenya). Countries are of course also hugely differently placed in terms of their location and degrees of interdependence with the global economy. A smaller, traditionally energy-importing country such as Uruguay, for example, is better placed to adopt bold emissions reductions targets and derive 94.5% of its electricity from renewable energy, benefiting as it does from abundant alternative domestic sources to service its population of just 3.4 million (Watts 2015). Whilst there is not space to here to delve into these national experiences in greater depth, it is notable that variation in the institutional form of country level governance regimes, patterns of dependence on fossil fuel energy, systemic differences among states including their population densities, carbon intensity, and per capita incomes, play a part alongside variations in the traditions of economic intervention by states (Lachapelle and Paterson 2013). But even economies heavily dependent upon fossil fuels, such as Saudi Arabia, are seeking to diversify their energy mix (Van de Graaf & Bradshaw 2018, this SI), pointing again to the need to relate national situations to global contexts in order to avoid the 'territorial trap' of viewing these developments in isolation where comparative advantages in research and development, manufacturing and installation combine in different ways across these settings (Lachapelle et al 2017).

Understanding the specific alignments of social forces requires attention to particular national contexts, nevertheless. In South Africa, for example, the ties between state and the corporate sector are described in terms of a 'Minerals Energy Complex' (MEC) (Baker et al 2014; Fine and Rustomjee 1996): a regime of accumulation based on low-cost state-owned electricity production (via the public utility Eskom), cheap labour and large-scale national and international corporate capital tightly bound to the energy and mining sectors. Getting within the state to look at the balance of power between competing social forces helps to identify where change might come from at a particular historical juncture and why the nature and pace of diversification of the energy mix is being directed so tightly by the incumbent regime, as with South Africa's RE-IPPPP (Renewable Energy Independent Power Producers Procurement Programme). Historically, the importance of assuring a social contract or pact between capital and labour emerges as key to attempts to re-organise production and has implications for the prospects of a 'just transition' and, in particular, how labour might benefit from a switch of industrial base to lower carbon forms of energy.

What these literatures from IPE and beyond point to is not only the importance of a more critical and realistic understanding of what roles states are able and willing to play in transition processes, but also an appreciation of the social relations crystallised in the use (as well as non-use) of state power towards transformational ends (Brand 2008; Newell 2008).

4. Globalisation: The Transformative Power of Finance

Literatures and perspectives from IR and IPE can make a second, essential, contribution to debates about transitions by developing and theorising the global dimensions of transitions and the ways in which the organisation of the global economy enables and constrains particular types of transition projects. While literatures on socio-technical transitions refer to 'landscape factors' which impinge upon the possibility of transitions as comprising the structuring forces of ideologies, institutions, discourses and political and economic trends that constitute enduring forms of socio-technical organization, they lack an account of the ways in which these are expressed as practices of power.

A common theme in critical IPE literatures is the extent to which and the ways in which contemporary forms of globalisation restrict the policy menu of states to interventions compatible with the requirements of a neo-liberal global economy (Appelbaum and Robinson 2005). Indeed, a key aspect of the global political economy of energy transitions is the neo-liberal context in which they have to occur. The exercise of what neo-Gramscians refer to as 'disciplinary power' (Gill 1995) over states' energy pathways is not just confined to developing countries over whom multilateral institutions can

exercise more structural power, as we will see in the next section. There are also very real constraints upon richer countries' freedom of manoeuvre in a globalised and liberalised economy. Threats of capital flight invoked by fossil fuel energy interests and fears among state elites of incumbents losing competitiveness have been frequent features of efforts to introduce climate mitigation measures. It has played out, for example, in debates about carbon taxes such as the EU's carbon tax debate in early 1990s which prompted what *The Economist* at the time described as the most vociferous lobbying campaign ever mounted by industry, including energy intensive industries (Newell and Paterson 1998), and more recently over back-loading proposals in the EU Emissions Trading Scheme (ETS) to create scarcity and push up prices, resisted by many utilities on competitiveness and carbon leakage grounds.

In understanding why states are so sensitive to such pressures, we can draw upon Cox's reflections on the internationalisation of the state whereby, 'Adjustment to global competitiveness is the new categorical imperative' (Cox 1993: 260). In echoes of Poulanztas (2014), Jessop too draws attention to the ways in which the reorientation of economic and political strategies in response to globalization has served to 'modify the institutional materiality and strategic bias of accumulation regimes and their associated political frameworks' (2002:7). In Gramscian understandings, states are often conceived of as transmission belts for the preferences of a transnational class from the global into national economic spheres. This involves the formation of coalitions and historic blocs of social forces across, as well as within countries (Cox 1987). The discussion below, for example, shows how combinations of investors, donors and state elites have secured and enforced a dominant view of the desirability and efficacy of market-led energy transitions over more transformative alternatives.

What a critical account would also want to emphasise, however, is the potential for transformation: fractures and vulnerabilities in the existing (energy) order. In this context, shifts in power resulting from globalisation might also create opportunities to de-stabilise dominant regimes. Notable in this regard is the interest that one set of powerful actors in this current phase of neo-liberalism – global finance – has shown in de-carbonisation. This builds on IPE scholars' emphasis on the ways in which, in an era of post-Fordism, the current finance-led regime of accumulation has become the dominant growth model in the contemporary global economy from the late 1970s and early 1980s. This affords global finance a potentially decisive role in the form that responses to climate change take (Paterson 2010). Departing from an historic role in literally fuelling the industries and underwriting the infrastructures that have given rise to our current planetary predicament, finance is increasingly central to debates about divestment from fossil fuels, disclosure and re-positioning investments in fossil fuels as liabilities rather than assets. This is manifest in active engagement of finance capital from banks and investment companies to pension funds, hedge funds and the like, in carbon trading, carbon disclosure schemes and capitalising on the new carbon economy.

Recognising the heightened power of finance in this phase of capitalist development means asking questions about the opportunities of trying to harness that power to the project of decarbonisation (see also Neville et al 2018, this SI). For example, there is increasing pressure to disclose the carbon in companies' portfolios: from the Securities and Exchange Commission rulings, for example, forcing companies to disclose information about GHG emissions alongside their financial reporting or the wave of shareholder activism that has emerged over the last 10 years (Newell 2008). This both sensitises investors to the risks they may be exposed to and provides them with the necessary information to assess risks across higher and lower carbon portfolios. For example, the Carbon Disclosure Project (CDP) works with a network of investors and purchasers, representing over $100 trillion in assets, to help reveal the risk in their investment portfolios and aims ultimately to sensitise investors to climate change as an opportunity as well as a threat (CDP 2017). This relates to broader warnings about 'un-burnable carbon' and the 'stranded assets' that many investors may be left with in order to realise ambitions to keep warming below 2 or 3 degrees are to be achieved. By some calculations between 60-80% of coal, oil and gas reserves of publicly listed companies are 'un-burnable' if the world is to have a chance of not exceeding global warming of 2°C (McGlade and Ekins 2015). Even ExxonMobil, traditionally a recalcitrant in the climate debate, has faced a large investor inquiry issued to the 45 top fossil fuel companies, coordinated by Ceres and Carbon Tracker, and representing $3tn (£1.8tn) in assets (see also Neville et al 2018, this SI). It asked Exxon to report on how it was preparing for a carbon-constrained

world where greenhouse gas regulation and market forces strand uneconomic assets, and whether money spent finding more reserves is in shareholder interests (Lamb and Fugere 2014).

Seeking to engage and enrol finance capital in these ways comes with many limitations and contradictions and banks and investors are a fickle ally, but if the signals are 'long, loud and legal' (Hamilton 2009) that money can be made by investing first in a low carbon economy, then patient capital at least may be one element of a powerful coalition of the 'winning and the willing' regarding de-carbonisation. Historically, it is certainly the case that finance capital has been vital to creating waves of creative destruction which unsettle existing technologies, industries and bases of political power. Indeed, drawing on historical political economic analysis, Carlota Perez's (2013) work reminds us of the key role of finance in supporting past transitions – the 'grand experiments' she refers to 'when unrestrained finance can override the power of the old production giants and fund the new entrepreneurs in testing the vast new potential'. Though current debates about transitions and transformation place technology centrally in their vision of achieving a lower-carbon model of development, Perez shows that finance capital is crucial to the Schumpetarian 'waves of creative destruction' that challenge and dislodge the power of incumbents. Examples include the technological transformations produced in the Industrial Revolution, what she refers to as the 'age of steam and railways', and around 'oil, automobile and mass production' in the Fordist era described above, for example (Perez 2002). Indeed, as Arrighi notes: 'Throughout the capitalist era financial expansions have signalled the transition from one regime of accumulation on a world scale to another. They are integral aspects of the recurrent destruction of 'old' regimes and the simultaneous creation of new ones' (2010: xi-xii).

The strategic question is whether immensely powerful actors will enrol in the project of financing de-carbonisation strategies and, in political economy terms, tip the balance of power further in favour of those pushing for a low carbon economy such that their interests come to be identified as those of 'capital-in-general' (Holloway and Picciotto, 1978). Thus far, governments generally have not been bold enough to chart a clear course out of fossil fuels. Witness, for example, the deletion of text at Rio + 20 in 2012 calling for reductions in fossil fuel subsidies that stand at around US$5.3 trillion a year (IMF 2015). It is perhaps unsurprising then that, as Di Muzio concludes, 'investors are nowhere near betting on a future outside of fossil fuel energy' (2012: 365). Indeed, the oil giant Exxon in a report on *Energy and Carbon – Managing the Risk*, ironically released the same day as the latest UN IPCC report warned of the catastrophic effect climate change will have on world populations, stated 'We are confident that none of our hydrocarbon reserves are now or will become "stranded"', predicting there was no danger shareholders would lose value in a carbon-constrained world (O'Meara 2014).

While an IPE account drawing on Regulation theory would provide an appreciation of both how global finance came to be so powerful at this historical juncture and of the forms of power it exercises over states, our understanding of the role of finance capital needs to be further disaggregated in order to assess the likelihood of different forms of capital playing an active role in accelerating low carbon energy transitions (Spratt 2015). While 'patient' capital might be able to wait for a return over longer time frame, this is not true of private equity investors and hedge funds (Mazzucato 2011). Different types of finance capital each operate according to different thresholds of risk regarding the places, technologies and projects they are willing to invest in and on what basis. This takes us back to the role of the state in setting the direction of change, such that a lower carbon energy future looks attractive and financially viable to powerful investors for whom states are keen to create and nurture new sites of accumulation. In this regard coordinated market economies may more able to construct 'long, loud and legal' signals to patient capital investors than liberal ones which may give a freer rein to restless capital focussed on a short-term return.

In terms of the analysis here, the key point is to emphasise the role of finance, as one powerful fraction of capital, whose interests might yet be de-linked from the idea that the interests of capital in general are best served by an accumulation regime dependent on fossil fuels. In this sense, strategies of divestment, disclosure and shareholder activism build on a longer history of attempts by activists to engage financial actors, such as the insurance industry, as a way of breaking up the bloc of industrial power traditionally opposed to action on climate change (Leggett, 1996; Paterson, 2001).

5. Global Governance and World Order

The third area where IPE can make an important contribution to the theorisation and practice of transitions is around global governance. Though work on socio-technical transitions lists 'institutions' as one among many 'landscape' factors that can shape conditions for disruptive change, critical thinking about the role of global governance institutions in enabling and constraining transitions has been largely absent.

There is, nevertheless, a growing body of work on global energy governance which looks at key institutions such as the International Energy Agency (IEA), OPEC (Colgan 2014) and coordinating mechanisms such as UN-Energy (van de Graaf 2013; Goldthau and Karlsson-Vinkhuyen 2010). This has focussed mainly on classic IR questions of how much autonomy such institutions enjoy from states, the power they exercise over their members and how successfully they are able to coordinate cooperation. The extent to which and the ways in which they shape, enable or inhibit particular transition pathways has been less explored. Yet a global political economy of transitions requires an account of the ways in which institutions of global energy and climate change governance, as well as a broader set of multilateral economic institutions, and their unequal inter-relationship enable and constrain particular energy pathways.

The multiple and overlapping dimensions of energy transitions – particularly, the need to address energy security, energy poverty and climate change issues simultaneously – creates a huge challenge for the current global order centred on an energy regime complex where different institutions are charged with addressing each of these issues separately. None have the mandate or capacity to orchestrate the re-structuring of the global energy order as opposed to supporting discrete national or socio-technical transitions. Indeed, this scholarship demonstrates that global energy governance has traditionally been very weak (Florini and Sovacool 2009; Karlsson-Vinkhuyen 2010). It is possible to over-state the influence even of those actors in global energy governance considered to wield the most power, including 'Producer clubs' such as OPEC, 'consumer clubs' such as the IEA, or groupings dominated by wealthier countries such as the G8 and OECD. Despite greater attention to energy issues in international relations from the Gleneagles summit in 2005 onwards, and the proliferation of public-private partnerships (PPPs) and transnational governance in the energy domain (Bulkeley et al. 2012), overall global energy governance remains weak, fragmented and incoherent from point of view of delivering low carbon transitions. For example, the World Bank – one of the most powerful actors in this arena as interim trustee of the Green Climate Fund and with its own extensive portfolio of Climate Investment Funds, and despite its ambition to lead the world on climate change – continues to provide high levels of finance to fossil fuels (USD $3 billion in 2014 alone) (Mathiesen 2015), undermining the IMF's efforts to remove fossil fuel subsidies.

Nevertheless, the observed under-development of global energy governance would not surprise most IR scholars. The proximity of energy to core state strategy, given its centrality to security and growth, make it a highly political issue. Energy chapters in trade agreements are often the most contested (Newell 2011). Indeed the problem is the extensive *un-governance* of energy (areas of deliberate non-intervention) where lock-in means investor interests are well protected by trade rules and investment arbitration procedures observed in cases brought against governments by energy companies claiming they have been subject to trade discrimination (Newell 2007). This is not to rule out an important future role for institutions of global governance including setting new rules, levering new finance and creating new infrastructures, or playing more proactive coordinating functions as occurs in regional contexts such as the European Energy Charter. Indeed, there are frequent calls to strengthen existing institutions or to create new initiatives such as pleas for a global Marshall Fund or Apollo programme (King et al u.d) or to scale up support for renewable energy development and deployment as proposed at the Paris COP21 by the 'Breakthrough Energy Coalition' of twenty-five leading investors (Milman 2015).

Yet, looked at together and more critically, it is clear that the purpose of existing global bodies with a direct mandate to address energy issues is more 'market-enabling' than 'market-restricting' – providing regulation 'for' energy corporations rather than 'of' them – and showing a strong commitment to energy

market liberalisation. Bodies such as the IEA, World Bank and OECD are unsurprisingly committed to a 'market liberal' view of the role of the state and the means by which de-carbonisation, in so far as it is considered at all, is to be achieved: though pricing, innovation and technology development and transfer, to the exclusion of other pathways to transition or transformation. The unevenly shared power to shape transition pathways is especially relevant when considering the relationship between multilateral development banks and lower income states in the global South. Neo-Gramscians refer to 'disciplinary neo-liberalism' (Gill, 1995)[1] in this regard: a set of practices pursued by key international institutions and multilateral development banks, in constraining the policy autonomy and developmental space of poorer countries over which they exercise control through their lending practices, conferring financial support upon policies they approve of, or withdrawing it from those they do not (Gallagher 2005). This raises key questions about which instruments states have available to address the challenges of de-carbonising their economies when many have ceded direct control over their energy sectors and when forms of policy intervention historically used to support new energy regimes in the past (e.g. subsidies, infant industry protection and looser forms of intellectual property protection) are increasingly circumscribed by trade rules.

Processes of power sector reform in the global South are particularly revealing of particular ways in which pressures are brought to bear to reconfigure energy systems. Multilateral development banks have played a leading role in re-structuring the domestic economies of developing economies and reducing their scope for autonomous action. The increasingly obvious need for regulation and steering of economies onto a lower carbon energy trajectory has become apparent at a time when many states have relinquished, or been forced to relinquish, control over key parts of their energy sectors (such as generation, distribution, transmission) as a result of energy and power sector reform programmes promoted by the World Bank in particular (Tellam 2000). For example, Kenya's adoption of neoliberal energy sector reforms has been rewarded by support from bilateral and multilateral donors, opening up opportunities for foreign capital to meet the shortfall in energy supply. In this sense it is unsurprising that Kenya has been described as an obvious choice of pilot country for climate finance mechanisms such as the World Bank's *Scaling-Up Renewable Energy Programme (SREP)*. Kenya has been described as 'the pilot for everything' and is often compared favourably with neighbours, such as Tanzania, on the basis that, as a World Bank official put it, 'Kenya has always been private sector focused and avoided the virulent forms of socialism of some of its neighbours' (cited in Newell and Phillips 2016).

In a more critical vein, and going beyond a focus on questions of institutional emergence, evolution and effectiveness, critical IPE might also offer useful insights into the question of the role of energy in the world order. Following the neo-Gramscian work of Robert Cox (1987) implies a focus on the relationships among power, production and world order: the ideas, institutions and material capabilities that produce a particular energy order. Di Muzio (2015) refers to 'carbon capitalism' as the key to understanding the interconnections among energy, social reproduction and world order which reproduce a particular type of 'petro-market civilisation'. Here the emphasis is on how particular ideas and institutions reflect and seek to protect particular structures of power and production. This is sustained by a particular material base, enforced by military means to secure supplies, and expressed institutionally in the forms of global governance alluded to above. This takes us into the realms of the geo-politics of energy. Beyond detailing and accounting for power and resistance to change, this work also has an explicit focus on transformation: how one order declines and another rises (as with the transition from the Pax Britannica to the Pax Americana) over decades and centuries (Bromley 1991). Fordism, which peaked in the post-World War II decades of American dominance and mass consumerism, is also intimately connected to US global power (Rupert, 1995), just as the expansion of the industrial revolution was to Pax Britannica. Oil was central to the Fordist vision and securing access to it has become a key geo-political goal in its own right as part of the project of the 'new imperialism' pursued under the guise of creating a 'new world order' (Harvey, 2003; Rees, 2001; Kaldor et al, 2007). The securitization of energy at once fuels and reinforces the power of the military industrial complex consolidating the material capacity to secure and extract more energy. In this sense, as Huber notes, 'the ecological politics of climate change and the anti-war politics of Iraq both converge on a similar object of disdain – oil' (2008: 105). Moving beyond carbon means unsettling a politico-military order

that both consumes and secures vast amounts of fossil fuels. The U.S. military alone uses more oil than any other institution in the world (Union of Concerned Scientists 2017).

This is, however, a world order in flux characterised by on-going redistributions of power among states. Hence discussions about transitions should engage with a shifting landscape of power (in a general sense and in the sense transition theories use the term). Shifting geometries of power and geo-politics would include the enhanced power and resource demands of so-called 'rising powers' or BRICS. This refers not just to the strategies for acquiring new sources of energy, especially oil, to meet their energy and growth demands in ways likened problematically to a new wave of colonialism (Carmody 2011; Ayers 2013), nor merely to the enhanced bargaining leverage these powers now exercise in global institutions such as the WTO. But from an environmental point of view, how can we square their rising growth ambitions with climate constraints? Powers in the global North and South are making key decisions with huge and long-lasting lock-in effects for other richer and poorer countries pursued both through energy statecraft and via the investment strategies pursued by state owned enterprises and private TNCs. The global interdependencies that result from globalising strategies for securing energy security further challenge conventional ideas about state control over energy resources whether in relation to fossil fuels or through investments in 'clean energy', or as leading exporters of renewable energy technologies.

The emerging energy order is, therefore, increasingly multi-polar and more fragmented, but not necessarily more inclusive or sustainable. There has been a re-balancing of power in the energy sector as with other domains away from the West and towards China and India in particular, and a greater accent on resource nationalism which potentially challenges neo-liberal orthodoxies. At the time, and despite growing interest in capitalising on the low carbon economy and the export and first mover advantages it confers upon rising powers, the enrichment of state and corporate elites in all parts of the world has meant that energy security and growth continue to trump efforts to seriously reverse either energy poverty or climate change. While inter-state balances of power have shifted, intra and trans state power imbalances between competing social forces persist with the result that market liberal transitions prevail over broader social and economic transformations of energy politics.

6. **Conclusions: Towards Transformation**

'The crisis consists precisely in the fact that the old is dying and the new cannot be born; in this interregnum a great variety of morbid symptoms appear' (Gramsci, 1971).

'We are entering the declining decades of the fossil fuel era, that brief episode of human time when coal miners and oil workers moved an extraordinary quantity of energy ..up to the earth's surface, where engines, boilers, blast furnaces and turbines burned it at an ever increasing rate, providing the mechanical force that made possible modern industrial life.. electrical power and communication, global trade, military run empires and the opportunity for more democratic forms of politics' (Mitchell, 2011:231).

It is clearly too early to call time on the current fossil fuel energy regime and confidently label it a temporary, transient phase in the history of socio-ecological evolution as Tim Mitchell does in the quote above, implying that the global trade regime and military empires that characterise the contemporary world are in inevitable and terminal decline. Or to have the luxury to look beyond it, sure that a new energy order is in the process of being born out of the current interregnum (to borrow a phrase from Gramsci in the quote above), even if we are not yet sure what form it will take. While the 'morbid symptoms' produced by the old order are clear for all to see, the new order lacks a powerful author. There is still an awful lot of work to do in moving from one energy order to another.

An IPE analysis can bring to this debate a re-centring of the question of transitions as being one about how to dislodge an incumbent order resting on a tight alignment between a global economy materially dependent upon fossil fuels, global and national political institutions working to protect productive capital tied up in such an economy and deploying discourses of accommodation around green growth

and climate-compatible development. These advance what Gramsci referred to as 'trasformismo' and not transformation, by protecting existing structures of power from the threat to their legitimacy and profitability which climate change presents. This takes us beyond a focus on a national level 'regime' or set of socio-technical practices to address a set of actors, global networks and relations of power which sustain and benefit from a fossil-fuel dependent economy whose continued growth threatens the future habitability of life on Earth. There are intimate (though not mono-casual and linear) links between power, production and world order. World order, within which global governance is one concrete expression, both protects the existing structure of production and reinforces existing relations of power using disciplinary power to lock in dependence upon a global economy organised around fossil fuels and a set of policy measures compatible with neo-liberal globalisation in which needed state control over the energy sector is harder to exercise and in which investor rights are protected and enforced at regional and global levels.

State power remains a key terrain for the expression of competing views and interests about energy pathways which get transmitted into global institutions, just as global initiatives are translated and refracted through patterns of social power at the national level through the internationalisation of the state. Which interests are advanced and protected and which get overlooked is often a function of the material and productive base of the economy and how far it relies upon high carbon forms of energy. For Gramsci, hegemony implies 'not only a unison of economic and political aims, but also intellectual and moral unity, posing all the questions around which the struggle rages' (1971: 181-2). Moreover, 'the development and expansion of the [dominant] group are conceived of, and presented, as being the motor force of a universal expansion, of a development of all the national energies'. The recent attempts by oil majors to invoke energy poverty as a major reason for the necessary expansion of their industry, even in the face of climate change, is an obvious attempt to do this. In this way 'the dominant group is coordinated concretely with the general interests of the subordinate groups' (Gramsci 1971: 182).

And yet despite evidence of this mutually reinforcing relationships among ideas, institutions and material capabilities, this power is not completely hegemonic. Indeed, hegemony is *never* complete. Gramsci was alert to the fact that hegemony necessarily also creates vulnerabilities, fragilities and opportunities, therefore, to resist its reach. Rather emphasise the 'static' and 'immobile' in relation to social forces, he emphasises a 'relation of forces in continuous motion' pointing to the possibilities of a 'shift in equilibrium' (1971:182). In this sense, it aligns with the analysis of incumbent power found in the Multi-Level Perspective in transitions theory (Geels 2014), but rather foregrounds shifts in the balance of power between social forces.

Here I have highlighted, in particular, the scope for shifts in the interests of capital in general as having the potential to bring about disruptive change—as restless finance capital has done many times before when the incumbent regime fails to serve its needs (Perez 2002). We noted in the discussion on globalisation the potential to enrol powerful fractions of capital in projects of de-carbonisation to move from a carbon economy to a climate capitalism where new and attractive sites of accumulation are created in a lower carbon economy, albeit one still characterised by the intrinsic inequities and patterns of exploitation associated with contemporary capitalism. This forces us to engage with questions of strategy: the coalitions and social forces that will be required to re-organise the global economy along low carbon lines and the constraints that any such endeavour is likely to encounter.

But the important task of identifying potential sites of change should not detract from the need to address the intransigence and resistance of the 'incumbent regime': those actors that benefit from the status quo and are thus likely to resist change. This is a far more difficult political economy. Neither the climate change regime despite the Paris agreement, nor carbon markets (where prices of carbon are at record lows) nor governments are sending powerful signals to the worlds of finance and industry that the future lies in sustainable low carbon energy. This will be key. While it continues to be profitable and legitimate to increase exploitation of new reserves of fossil fuels – even in the most extreme ways and with the most devastating consequences (through tar sands, fracking, drilling in fragile artic environments etc.) – finance will not shift. This should chime a note of caution about the imminent demise of the fossil fuel order. As Huber notes: 'Any analysis of a mode of production beyond

capitalism, or the possible emergence of an "alternative energy economy", must come to grips with the deep embeddedness of fossil-energy in the most basic forms of commodity circulation' (Huber, 2008: 112). As the current political economy attests, energy issues are at the epicentre of not only the geopolitics of empire and the global climate crisis, but also of the more banal, everyday reproduction of capitalist social life. It is also pertinent to recall that previous dramatic re-organisations of production and technology in the energy sector aimed at securing a new round of accumulation have explicitly sought to increase levels of consumption by making energy easier to access and distribute, and cheaper to consume (Fouquet 2010). Moreover, historical analysis of energy shifts suggests that in a growth-oriented economy 'even a major shift towards low carbon energy does not guarantee that the global economy will reduce fossil fuel consumption. Indeed, such a shift may simply promote overall greater energy consumption' (Fouquet and Pearson 2012: 2).

Empirically, this account suggests the value of further empirical work on unsettling incumbency: the specific modalities and strategies for un-doing carbon and the modes of power which protect it from being transformed. As suggested here, this might imply a focus on the potentially disruptive power of finance capital in conjunction with movements from below resisting extractivism and the building of new fossil fuel infrastructures. I also noted the need to view the unfolding dynamics between and across states as part of global networks and coalitions of actors, rather than as bounded and autonomous entities. The intimate links, highlighted here, between global (re)organisations of production and finance and constitutions of governance in the energy realm, suggest the value of following embryonic transitions empirically to explore their potential to evolve into the deeper and more disruptive transformations that are urgently required to counter the hegemony of the current energy regime.

Overall, an analysis such as this, informed by critical traditions in IPE, provides a source of clues as to the prospects of steering the great forces of human history in more sustainable directions – in particular, towards the de-carbonisation of the global economy – by drawing attention to the relationship between states, the global economy and global governance. Hence whilst emphasising the links between production, power and world order may be thought to over-emphasise the static and hegemonic, it also serves to highlight vulnerabilities, weak spots and active agents of change, albeit at times ones which would not be regarded as progressive, such as finance capital, whose support for de-carbonisation will be critical to re-defining the needs of capital-in-general in the contemporary context. What the analysis also demonstrates is the centrality of energy to statehood, global governance, geo-politics and the globalisation of the economy such that the mutual neglect by IPE scholars of energy, and scholars of transitions of international political economy is no longer tenable (Kern and Markard 2016; Goldthau et al 2018).

Such an account also implies a critique, however, of the idea that transitions, or indeed transformations, can be largely organised through idealised 'transition management', visions, or blueprints, without the acquiescence of powerful fractions of capital. This is not to downplay the role of the state per se given its willingness to intervene on behalf of capital in the ways described in the examples above. Rather, it is to suggest that the 'animal spirits' of capitalism in their restless pursuit of profit through innovation and (creative) destruction will be decisive. There was after all no blueprint for previous industrial revolutions. We run the risk, therefore, of allowing a mismatch between the theories of change implicit in many understandings of what is implied by low-carbon energy transitions, and what historical experience seems to suggest about how, when and why change in capitalism occurs.

Hence a reading of the landscape of power exposes both the enormity of political lock-in – the interests and the durability of the order – but also of the scope for radical change as we have seen with the shift from coal to oil and now as the oil economy faces a growing challenge from a renewed 'dash to gas', the falling price of renewable energy amid the spectre of climate change. The evolving nature of the global capitalist system has both intensified and re-scaled the processes which have brought about the current predicament for society and constitutes the terrain upon which near-term strategies aimed at addressing climate change, and challenging the energy order which fuels it, will have to be developed. It is precisely an understanding of this terrain, how it has been formed historically through innovation, exploitation and struggle that highlights the dilemmas and contradictions facing progressive movements today. Though signs of immediate and drastic change are not abundant, there is significant movement

from below. It is worth recalling that transitions, let alone transformations, take decades or often centuries. Widespread public and political engagement with climate change is only 30 years old at best, and has intensified probably only in the past 10-15 years: set against the long durée of capitalist development, a very short time indeed.

References

Aglietta, M. (2000) *A Theory of Capitalist Regulation: The US Expe*rience London: Verso.

Allen, R. (2012) 'Backward into the future: The shift from coal and implications for the next energy transition', *Energy Policy*, 50: 17-23.

Altvater, E. (2006) The social and natural environment of fossil capitalism. In L. Panitch and C. Leys (eds.) *Coming to Terms with Nature: Socialist Register 2007*. London: Merlin Press, 37–60.

Appelbaum, R. and W. Robinson (eds) (2005) *Critical Globalization Studies* London: Routledge.

Ayers, A. (2013) 'Beyond Myths, Lies and Stereotypes: The Political Economy of a "New Scramble for Africa". *New Political Economy* 18(2): 227–57.

Baker, L. P. Newell & J. Phillips (2014) 'The Political Economy of Energy Transitions: The Case of South Africa', *New Political Economy*, 19(6):791-818.

Brand, U. (2008) *Conflicts in Environmental Regulation and the Internationalization of the State*. London: Routledge.

Bromley, S. (1991) *American Hegemony and World Oil*. Cambridge: Polity.

Buck, D. (2006) The ecological question: can capitalism prevail? In L. Panitch and C. Leys (eds.) *Coming to Terms with Nature: Socialist Register 2007*. London: The Merlin Press, 60–72.

Bulkeley, H. and P. Newell (2010) *Governing Climate Change* Abingdon: Routledge.

Carmody, P. (2011) *The New Scramble for Africa*. Cambridge: Polity.

CDP (2017) https://www.cdp.net/en/info/about-us Accessed 1st March.

Clapp, J. and P. Dauvergne (2011) *Paths to a Green World: The Political Economy of the Global Environment*, 2nd edn. Cambridge, MA: MIT Press.

Colgan, J. (2014) 'The Emperor Has No Clothes: The Limits of OPEC in the Global Oil Market' *International Organization* 68, Summer, pp. 599–632.

Cox, R. (1987) *Production, Power and World Order*. New York: Columbia University Press.

Cox, R. (1993) 'Structural issues of global governance: Implications for Europe' in Gill, S. (ed) *Gramsci, Historical Materialism and International Relations* Cambridge: CUP, pp. 259-290.

Cox, R. (1983) 'Gramsci, Hegemony and International Relations: an Essay in Method', in *Millennium: Journal of International Studies*, 12(2).

Di Muzio, T. (2015) *Carbon Capitalism: Energy, Social Reproduction and World Order* London: Rowman and Littlefield.

Di Muzio, T. (2012) 'Capitalizing a future unsustainable: Finance, energy and the fate of market Civilization', *Review of International Political Economy* 19(3): 363–388.

Di Muzio, T. and J. Ovadia (2016) (eds) *Energy, Capital and World Order* Basingstoke: Palgrave.

Dunlap, A. and J. Fairhead (2014) The Militarisation and Marketisation of Nature: An Alternative Lens to 'Climate-Conflict' *Geopolitics* 19:4, 937-961.

Fine, B. and Z. Rustomjee (1996) *The Political Economy of South Africa: From Minerals Energy Complex to Industrialisation* Boulder: Westview Press)

Florini, A. and Sovacool, B. K. (2009) 'Who Governs Energy? The Challenges Facing Global Energy Governance', *Energy Policy,* 37 (12), pp. 5239–5248.

Fouquet, R. (2010) 'The slow search for solutions: Lessons from historical energy transitions by sector and service'. *Energy Policy* 38(10): 6586-6596.

Fouquet, R. and Pearson, P. (2012) 'Past and prospective energy transitions: Insights from history', *Energy Policy*, vol 50, pp1-7

Gallagher, K. (ed.) (2005) *Putting Development First: The Importance of Policy Space in the WTO and International Financial Institutions*. London: Zed Books.

Geels, F. (2002) 'Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and case study', *Research Policy,* 31(8/9), pp. 1257-1274.

Geels, F.W. (2013) 'The impact of the financial–economic crisis on sustainability transitions: Financial investment, governance and public discourse', *Environmental Innovation and Societal Transitions* 6 (2013) 67– 95.

Geels, F. (2014) 'Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspectives'. *Theory, Culture & Society.* 31(5) 21–40

Geels, F. W. and J. Schot (2007) 'Typology of sociotechnical transition pathways'. *Research Policy* 36(3), pp. 399-417.

Gill, S. (1993) (ed) 'Gramsci and global politics: towards a post-hegemonic research agenda' in *Gramsci, Historical Materialism and International Relations* Cambridge: CUP, pp. 1-21.

Gill, S. (1995) Globalization, market civilisation and disciplinary neoliberalism. *Millennium: Journal of International Studies* 24(3): 399–423.

Goldthau, A., M. Keating, C. Kuzemko (eds.) (2018) *Handbook of the IPE of Energy and Natural Resources*. Cheltenham & New York: Edward Elgar

Gramsci, A. (1971) *Selections from the Prison Notebooks,* edited and translated by Q. Hoare and G. Nowell Smith. New York: International Publishers.

Grubler, A. (2012) 'Energy transitions research: Insights and cautionary tales', *Energy Policy*, 50:8-16.

Hall, P. and Soskice, D. (2001) *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford University Press, Oxford

Hamilton, K. (2009) *Unlocking Finance for Clean Energy: The Need for 'Investment Grade' Policy*. Energy, Environment and Development Programme Paper 09/04, December. London: Chatham House.

Harvey, D. (2003) *The New Imperialism*. Oxford: Oxford University Press.

Heinrich Böll Foundation (2013) 'Research for and on the "Great Transformation"', Berlin: Heinrich Böll Foundation.

Hoffmann, M. (2011) *Climate Governance at the Cross-Roads: Experimenting with a Global Response After Kyoto*, Oxford: Oxford University Press.

Holloway, J. and Picciotto, S. (eds) (1978) *State and Capital: A Marxist Debate* London: Edward Arnold.

Huber, M. (2013) *Lifeblood: Oil, Freedom and the Forces of Capital* Minnesota: University of Minnesota Press.

ICTSD (2011) China to end challenged subsidies in wind power case. *Bridges Trade BioRes* 11(11), 13 June.

IMF (2015) 'Counting the Cost of Energy Subsidies', *IMF Survey*, July 17, 2015 http://www.imf.org/external/pubs/ft/survey/so/2015/NEW070215A.htm

Jessop, B. (2002) *The Future of the Capitalist State* Cambridge: Polity.

Johnstone, P., and P. Newell (2017) 'Sustainability transitions and the State', *Environmental Innovation and Societal Transitions*

Kaldor, M., Lynn Karl, T. and Said, Y. (eds.) (2007) *Oil Wars*. London: Pluto Press

Karlsson-Vinkhuyzen, S. (2010) 'The UN and Global Energy Governance: Past Challenges, Future Choices', *Global Change, Peace and Security*, 22 (2), pp. 175–195.

Kern, F., (2011) 'Ideas, institutions and interests: Explaining policy divergence in fostering 'system innovations' towards sustainability', *Environment and Planning C: Government and Policy*, 29(6), 1116-1134.

Kern, F. and J. Markard (2016) 'Analysing energy transitions: Combining insights from transition studies and International Political Economy' in Van de Graaf et al (eds) *The Palgrave Handbook of the International Political Economy of Energy* London: MacMillan, pp. 291-318.

King, David et al (u.d) *A Global Apollo Programme to Combat Climate Change* London: LSE.

Kuzemko, C., M. Lockwood, C. Mitchell, R. Hoggett (2016) 'Governing for sustainable energy system change: Politics, contexts and contingency', *Energy Research and Social Science* (12): 96–105.

Lachapelle, E., R. MacNeil & M. Paterson (2017) The political economy of decarbonisation: from green energy 'race' to green 'division of labour', *New Political Economy*, 22:3, 311-327.

Lachapelle, E. and Paterson, M. (2013) 'Drivers of National Climate Policy', *Climate Policy*, 13 (5): 547–71.

Leggett, J. (1996) *Climate Change and the Financial Sector*. Munich: Gerling Akademie Verlag.

Leftwich, A. (2000) *States of Development: On the Primacy of Politics in Development* Cambridge: Polity.

Levy, D. and Newell, P. (2002) Business strategy and international environmental governance: toward a neo-Gramscian synthesis. *Global Environmental Politics* 3(4): 84–101.

Loorbach, D. (2007) *Transition Management: New Mode of Governance for Sustainable Development* Utrecht: International Books.

MacKenzie, D., Beunza, D., Millo, Y., and Pardo-Guerra, J. P. (2012) Drilling through the Allegheny mountains: liquidity, materiality and high-frequency trading. *Journal of Cultural Economy*, 5 (3). pp. 279-296.

MacNeil, R. & M. Paterson (2012) Neoliberal climate policy: from market fetishism to the developmental state, *Environmental Politics*, 21:2, 230-247.

Malm, A. (2016) *Fossil Capital: The rise of steam power and the roots of global warming* London: Verso.

Mathiesen, K. (2015) 'World Bank fossil fuel financing leapt in 2014 despite its calls to end subsidies' *The Guardian* http://www.theguardian.com/environment/2015/apr/17/world-bank-fossil-fuel-lending-leapt-in-2014-despite-its-calls-to-end-subsidies

Marx, K. and Engels, F. (1998) [1848]. *The Communist Manifesto*. London: Verso.

Mazzucato, M. (2011) *The Entrepreneurial State* London: Demos.

McGlade, C. and P. Ekins (2015) 'The geographical distribution of fossil fuels unused when limiting global warming to 2 °C' *Nature* 517: 187–190.

Meadowcroft, J. (2009) 'What about the politics? Sustainable development, transition management, and long term energy transitions', *Policy Sciences*, 42, pp. 323–340;

Meadowcroft, J. (2011) 'Engaging with the politics of sustainability transitions', *Environmental Innovation and Societal Transitions*, 1, 70-75.

Mikler, J. and Harrison, N. (2012), 'Varieties of Capitalism and Technological Innovation for Climate Change Mitigation', *New Political Economy*, 17 (2), pp. 179–208.

Milman, O. (2015) 'Zuckerberg, Gates and other tech titans form clean energy investment coalition' *The Guardian* 30th November.

Mitchell, T. (2011) *Carbon Democracy: Political Power in the Age of Oil* London: Verso.

Moore, J. (2009) 'Ecology and the accumulation of capital: A brief environmental history of neo-liberalism', paper for the workshop 'Food, Energy, Environment: Crisis of the Modern World-System', Binghamton University, 9-10 October.

Morton, A. (2007) *Unravelling Gramsci: Hegemony and Passive Revolution in the Global Economy* London: Pluto Press.

Neville, K.; Cook, J.; Baka, J.; Bakker, K.; Weinthal, E. (2018) 'Can shareholder advocacy shape energy governance? The case of the US anti-fracking movement', *Review of International Political Economy*, forthcoming.

Newell, P. (2008) 'The political economy of global environmental governance' *Review of International Studies* Vol. 34 July, pp. 507-529.

Newell, P. (2011) 'The Governance of Energy Finance: The Public, the Private and the Hybrid', *Global Policy* Vol.2 No. 1, pp. 94-105.

Newell, P. and D. Mulvaney (2012) 'The Political Economy of the Just Transition'. *The Geographical Journal* 179 (2): 132-40.

Newell, P & M. Paterson (1998) Climate for business: global warming, the State and capital. *Review of International Political Economy* 5(4), pp. 679-704.

Newell, P. and M. Paterson. (2010) *Climate Capitalism: Global Warming and the Transformation of the Global Economy.* Cambridge: Cambridge University Press.

Newell, P. and J. Phillips (2016) 'Neoliberal energy transitions in the South: Kenyan experiences' *Geoforum* 74: 39-48.

O'Meara, D. (2014) 'Companies respond to shareholder activism on carbon risks' *Financial Post* April 10th .

Pearson, P. and Foxon, T. (2012) 'A low carbon industrial revolution? Insights and challenges from past technological and economic transformations', *Energy Policy*, 50:117-127.

Paterson, M. (2001) 'Risky business: Insurance companies in global warming politics', *Global Environmental Politics*, 1(3):18–42.

Pegels, A. (2013) (ed) *Green Industrial Policy in Emerging Countries* London: Routledge.

Perez, C. (2002) *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages* Cheltenham: Edward Elgar publishing

Perez, Carlota (2013) 'Unleashing a golden age after the financial collapse:
Drawing lessons from history', *Environmental Innovation and Societal Transitions* 6: 9– 23.

Podobnik, B. (2006) *Global Energy Shifts: Fostering Sustainability in a Turbulent Age*, Temple University Press, Philadelphia.

Polanyi, K. (1980) [1944] *The Great Transformation*. Boston, MA: Beacon Press.

Poulantzas, N. (2014) *State, Power, Socialism* London: Verso.

Rees, J. (2001) Imperialism: globalization, the State and war. *International Socialism* 93.

Scoones, I., M. Leach, P. Newell (2015) (eds) *The Politics of Green Transformations* London: Routledge.

Stirling, A. (2014) 'Transforming power: Social science and the politics of energy choices' *Energy Research and Social Sciences* 1: 83-95.

Storper, M. and Walker, R. (1989) *The Capitalist Imperative: Territory, Technology and Industrial Growth*. Cambridge, MA: Blackwell.

Swilling, M. and E. Annecke (2012) *Just Transitions: Explorations of Sustainability in an Unfair World* South Africa: UCT Press.

Tellam, I. (ed.) (2000) *Fuel for Change: World Bank Energy Policy: Rhetoric and Reality*. London: Zed Books.

Union of Concerned Scientists (2017) http://www.ucsusa.org/clean_vehicles/smart-transportation-solutions/us-military-oil-use.html#.WLAzTstviUk Accessed 24th February 2017.

Van de Graaf, T. (2013). *The Politics and Institutions of Global Energy Governance*. Basingstoke: Palgrave Macmillan.

Van de Graaf, T., B. Sovacool, A. Ghosh, F. Kern (eds) (2016) *The Palgrave Handbook of the International Political Economy of Energy* London: MacMillan.

Van de Graaf, T.; Bradshaw, M. (2018) 'The stranded wealth of nations: Oil exporters, the shale revolution, and climate policy', *Review of International Political Economy*, forthcoming.

Verbong, G. and Loorbach (2012) (eds) *Governing the Energy Transition: Reality, Illusion or Necessity?* London: Routledge.

Wade, R. (2003) 'What strategies are viable for developing countries today? The WTO and the shrinking of development space'. In J. Timmons Roberts and A. Bellone Hite (eds.) (2007) *The Globalization and Development Reader*. Oxford: Wiley-Blackwell.

Watts, J. (2015) 'Uruguay makes dramatic shift to nearly 95% electricity from clean energy' *The Guardian* 3rd December Available at: http://www.theguardian.com/environment/2015/dec/03/uruguay-makes-dramatic-shift-to-nearly-95-clean-energy

WBGU (2011) *World in Transition: A Social Contract for Sustainability*, Berlin: German Advisory Council on Global Change.

Wilson, J. (2018) 'A securitisation approach to international energy politics', *Review of International Political Economy*, forthcoming.

Yergin, D. (2008) *The Prize: The Epic Quest for Oil, Money and Power* London: Simon & Schuster.

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[1]Disciplinary neo-liberalism, refers to the ways in which the scope for legitimate state action and progressive democratic politics is circumscribed by global trade and investment accords and the rights of capital over states begin to take the form of a 'new constitutionalism', protected by international law (Gill, 1995).